

University of Bahrain
College of Information Technology
Department of Computer Engineering

ITCE 202: Digital Logic
Test 1

Time: 1:00 hour

Date: November 2nd, 2004

Question	Marks	Score
1	24	
2	18	
3	18	
4	20	
5	20	
Total	100	

ID. No.	Name:	Sec.:
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Show all your work.

Q1 (24 points)

(4 points) (a) Convert $(326.5)_8$ to Hexadecimal

(4 points) (b) The following number 1 1 1 0 0 0 0 1 1 0 0 1 0 1 1 1 represents decimal digits in 4-3-2-1 weighted code. Find its equivalent in BCD weighted code.



(8 Points) (c) Divide in binary 1 1 1 0 1 00 by 1 0 1 0 and approximate the result up to two fraction bits.

(8 Points) (d) Perform the binary addition of the two decimal numbers (+39) and (-28), assume that the numbers are represented in 2's complement form.

Q2- (18 points)

(10 Points) (a) Simplify the following function to a minimum Sum of product form

$$Z = A \bar{B} C + F + (A \bar{B} D + C \bar{D})(\bar{C} E + \bar{F} + A \bar{B} D)$$

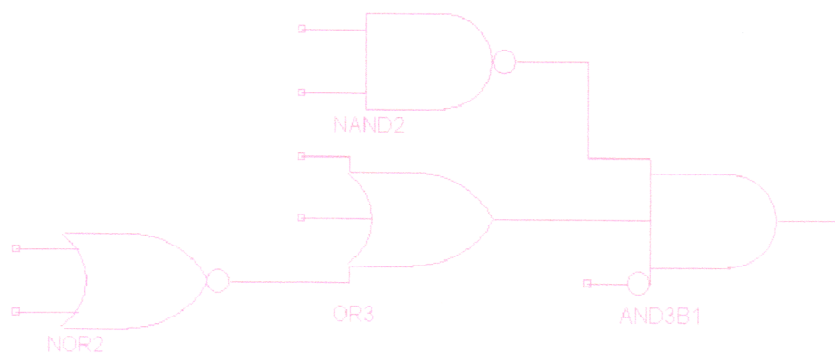


(8 Points) (b) Given that: $Z = \overline{E}G (A \oplus B + \overline{C}E)(\overline{A} + BG)$

Use De'Morgan's Theorem to find \overline{Z} . Express your answer in a sum of product form (Do not simplify).

Q3 (18 points)

For the circuit shown in figure 1, find:



(10 Points) (a) Z in a standard Sum of product (minterm form)

(8 Points) (b) \overline{Z} in a standard product of sums (algebraic form).



Q4 (20 points)

Realised the function Z given by the following equation using the minimum number of 2-inputs NAND gates only.

$$Z = \overline{A}BC\overline{D} + E\overline{F} + B\overline{D}\overline{G} + B\overline{D}\overline{E}$$

Q5- (20 points)

Given the Boolean function: $F = \overline{A}CD + A\overline{B}C\overline{D} + ABC + ACD + \overline{A}B\overline{C}D$

Assuming that the inputs $ABCD = 0000$, $ABCD = 1000$, and $ABCD = 1101$ never occur, find a minimum NOR-NOR network implementation for F.

